New Observations of the Crab Nebula and Pulsar

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We present a phase-resolved study of the X-ray spectrum of the Crab Pulsar, using data obtained in a special mode with the Chandra X-ray Observatory. The superb angular resolution easily enables discerning the Pulsar from the surrounding nebulosity, even at pulse minimum. We find that the Pulsar's X-ray spectral index varies sinusoidally with phase---except over the same phase range for which rather abrupt changes in optical polarization magnitude and position angle have been reported. In addition, we use the X-ray data to constrain the surface temperature for various neutron-star equations of state and atmospheres. Finally, we present new data on dynamical variations of structure within the Nebula.

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